in Paris, but to his extraordinary writing of books, in which we see an heroic effort to win a way to clearness for himself and others. Thus we have "La matiere vivante," "La Théorie nouvelle de la vie," "Evolution individuelle et Hérédité," "Traité de Biologie," "Le Déterminisme biologique," "Les Influences ancestrales," "La Lutte universelle," and at least ten more!

Dr. Le Dantec was a biologist of the mechanistic school; he held to a hard-and-fast determinism; he was a devoted disciple of Lamarck; he made passionate endeavours after scientific clarity as opposed to what he regarded as superstitious sentimentalism, metaphysical verbiage, and intellectual hypocrisy. While many of his radical ideas have been criticised as too abstract and simplicist, not gripping the actual facts of life, many others were certainly luminous and useful, such as that of the organism continually trafficking with its environment, sustaining itself by functioning, "l'édification de la vie par la vie." Of the man himself there is no doubt: his whole life spoke of courage, sincerity, a passion for veracity, a willingness to follow what he thought was truth wheresoever it led him.

NOTES.

On August 9–10 a large magnetic storm was recorded at Kew Observatory. It began with a "sudden commencement" at about 4.14 a.m. on August 9. The "sudden commencement" was unusually large, especially in D (declination). In H (horizontal force) it was not visibly oscillatory, consisting of a rise of about 110 γ ($1\gamma = 1 \times 10^{-5}$ C.G.S. unit). In D it was distinctly oscillatory, an easterly movement of about $4'$ being followed by a westerly movement of about $17'$. The extreme westerly position of the needle was reached about 4.50 a.m. on August 9, when the needle pointed $34'$ more to the west than it did when the storm began. The D trace was highly oscillatory at times, especially between 9.30 and 10.30 a.m. on August 9. Conditions became much quieter after 11 a.m., and continued so until 9.20 p.m. on August 9, when there was a recrudescence of the storm. The extreme easterly position was reached about 0.24 a.m. on August 10. The storm had pretty well subsided by 4 a.m. The total range of D during it was approximately $55'$. The disturbance in H, generally speaking, waxed and waned in intensity with that in D, but did not show so much abatement between 11 a.m. and 9.20 p.m. on August 9. The recrudescence after 9.20 p.m. on August 9 was, however, conspicuous. The lowest and highest values of H were both recorded on August 9, the former about 9.30 a.m., the latter about 9.30 p.m.; the total range was about 370 γ. During the greater part of the time the vertical force trace was not much disturbed. The value of the element was slightly depressed during the morning hours of August 9, and there was a considerably larger depression between 9.30 p.m. on August 9 and 2 a.m. on August 10. The range of the element during the course of the disturbance was about 250 γ. The disturbance was of the kind usually accompanied by aurora.

It was announced in Nature of August 2 that the Museums Association proposed to hold a conference in October next. The announcement was based upon a circular, dated July 24, asking persons who intended to be present to communicate with Mr. E. E. Lowe (Museum and Art Gallery, Leicester), who is hon. secretary of the association. A circular dated August 2, signed by the members of the Executive Committee, has now reached us, and we learn from it that the proposed conference will not be held, as a sufficient number of promises to attend has not been received.

The High Commissioner for New Zealand has been informed by cable that reports of the damage done by the recent earthquake in the southern part of North Island were much exaggerated, and that the earthquake was in no way destructive.

Mr. Charles T. Druery, who died on August 8, was a naturalist as well as a horticulturist of eminence. At a time when not many horticulturists were inclined to see beyond the horizon of their gardens, Mr. Druery did much to encourage the wider outlook which has now become more general. His passion for the study of ferns, and in particular for the abnormal and monstrous forms, led him to see that the science of genetics must be called in to help to explain the ways of cultivated as well as of wild plants. Of alert mind, he recognised at an early date the importance of Mendel's work, and it was his pen that wrote the first English translation of Mendel's famous memoir. In recognition of his services to horticulture his name was enrolled among those of the sixty original recipients of the Victoria Medal of Horticulture. A gifted linguist, Mr. Druery wrote on subjects other than horticulture. Quite recently he published a volume of verse—of a humour akin in type to that practised by early Victorians—and his many friends were compelled to admire, not only the versatility, but also the youthfulness of mind of a man who, though of advanced age, proved himself younger than most of those of a later generation.

Dr. A. Calmette, director of the Institut Pasteur, Lille, and Dr. L. Martin, director of the Hôpital Pasteur, have been appointed to subdirectorships at the Institut Pasteur, Paris.

The G. C. Greenwell silver medal of the North of England Institute of Mining and Mechanical Engineers has been awarded to Prof. W. G. Fearnsides for his paper on "Some Effects of Earth-movement on the Coal-Measures of the Sheffield District (South Yorkshire), and the neighbouring parts of West Yorkshire, Derbyshire, and Nottinghamshire."

According to the *Journal of Industrial and Engineering Chemistry*, the Seaman gold medal, which is each year awarded by the American Museum of Safety for the promotion of hygiene and the mitigation of occupational disease, has been conferred upon the Julius King Optical Company of New York, for their appliances against the dangers of ultra-violet and infra-red light.

Major J. C. Woods has been awarded the Gaskell prize of the Medico-Psychological Association of Great Britain and Ireland, consisting of fifty guineas and a gold medal, and Dr. M. Krohn a replica of the medal in silver and the sum of fifteen guineas.

The National Academy of Sciences of the United States has received from Miss M. H. Elliot the sum of 8000 dollars to establish a fund in memory of her late father, Daniel Giraud Elliot, and has accepted the trust. A medal, to be known as the Daniel Giraud Elliot gold medal, and an honorarium will be awarded annually for a paper, essay, or other work in some branch of zoology or palæontology published during the year. The award is not restricted to naturalists resident in the United States. Drs. H. F. Osborn,

C. D. Walcott, and F. A. Lucas have been appointed judges for the bestowal of the medal and honorarium. It is expected that it will be possible for the first award to be made in April, 1918.

THE mycological collection of the late Dr. J. W. Ellis has been acquired by purchase by the herbarium at Kew. It comprises nearly 1600 dried specimens, is especially rich in micro-fungi, and includes a series of mounted specimens of those of economic importance. There are also 330 microscopic slides.

AN Aerial Postal Service between Italy, Sicily, and Sardinia has already been established, as we read in the *Journal of the Society of Arts*, August 3. The first post was inaugurated on June 24 between Naples and Palermo, and three days later the next service, from Civita Vecchia on the mainland to Terranuova–Pausania (Sardinia). In the first trip from Naples to Palermo, a seaplane was used, carrying a heavy mail, flying at a height of 1500 to 2000 metres at 140 kilometres (say ninety miles) an hour, reaching Palermo in less than two hours and a half. The service from Civita Vecchia to Sardinia was opened on June 27 by two seaplanes, each carrying 100 kilogrammes of mail in watertight bags. The passage was made in an hour and forty minutes, leaving Civita Vecchia at 6.20 a.m. and reaching Terranuova about 8 a.m., and the return journey was made in about the same time.

AN appeal for the loan of prismatic compasses for use in the Army has been issued by the Countess Roberts. Any good prismatic compass, such as is used for map-making and surveying, would be acceptable. The instruments would be engraved and registered under the lenders' names to facilitate their return, when possible, after the war. They should be sent to the Manager of Lady Roberts's Field Glass Fund, 64 Victoria Street, S.W.1.

THE Cavendish lecture of the West London Medico-Chirurgical Society was delivered on June 22. The lecturer, Capt. Andrew Macphail, Canadian Army Medical Corps, who is professor of the history of medicine at McGill University, Montreal, took as his subject "A Day's Work." In a word-picture of considerable power he described the medical organisation of that part of the Army concerned with the attack on, and capture of, the Vimy Ridge. "The Medical Service, above all other services, has done its perfect work. It has yielded an army without sickness. I have never seen a case of typhoid, and the few infectious cases are of the nature of children's diseases. Except for a few days on the Somme, I have not seen more flies than one would see on a well-kept farm. Purified water is put into the men's bottles. To drink from an unauthorised source is a crime. Wells are examined even whilst they are yet under fire, and food is scrutinised before every meal. Men are bathed as methodically as they are fed, and by fire and steam the advances of the humble, but friendly, louse are discouraged. One acquires a certain pity for this most dependent and helpless of all creatures —his means of livelihood are so restricted and he is so unbeloved." He finally concluded with some inspiring sentences on the outlook, the lessons of the past, and the messages of war.

THE *Eugenics Review* for July (vol. ix., No. 2) contains an abstract of an address by Judge Henry Neil on the Mothers' Pension System, of which he is the founder. The State legislature of Illinois eleven years ago inaugurated the system, and at the present time thirty other States have adopted it. Mothers' pensions are maintenance grants made in respect of children under fourteen to a parent who is a "proper guardian"—that is to say, of established good character, but too poor to feed, clothe, and "home" her children adequately. The money is provided by general taxation, and the pensioned mother is put on the county pay-roll and receives her cheque every month. If she prove herself unable to handle the money properly her pension may be revoked, but very few cases of any abuse of this kind occur, and practically about three-fourths of the destitute children in the thirty States in which this pension system has been adopted are now looked after at home. Supervisors, appointed by each State, see that the children are properly cared for, and an immense saving in public money has been effected, the cost per child being about one-third that incurred by institutional care.

DRS. BROWNING, Gulbrausen, and Thornton give a further contribution on the antiseptic properties of flavine and brilliant green, with special reference to their suitability for wound treatment, in the *British Medical Journal* for July 21, p. 70. Flavine compounds and brilliant green are antiseptics which exert a slowly progressive bactericidal action. Concentrations of these substances, which at first inhibit, and finally kill, bacteria, are without harmful effect on the tissues locally or generally. Flavine compounds are enhanced in their bactericidal potency by the presence of serum, while brilliant green, in common with most other antiseptics, is reduced in its activity by serum. Brilliant green satisfies requirements for application by repeated irrigation in aqueous solution (1 : 2000), while with flavine, since it is most potent in the presence of serum, the indication is to arrange the wound dressing so that it may act in a serum medium. Operative measures are an essential preliminary to the effective use of therapeutic antiseptics in wounds, since the antiseptic can act only when brought into intimate contact with the infected tissues.

WHEN Mr. and Mrs. Routledge finished their investigations on Easter Island in 1915, they touched at Pitcairn Island, and there engaged two brothers, direct descendants of the *Bounty* mutineers, Charles Young, aged twenty-eight, and Edwin Young, aged twenty-five, to serve as hands on their yacht *Mana*. On their arrival in England these young men were sent to the Royal College of Surgeons to undergo examination by Prof. A. Keith and Dr. W. Colin Mackenzie. This is the first opportunity enjoyed by European anthropologists of examining members of this interesting community. From their report, published in the August issue of *Man*, it appears from examination of their genealogy that their ancestral composition should be 13/32 parts British and 19/32 parts Tahitian. Prof. Keith sums up the result of the examination as follows:—"I regard the two Pitcairn Islanders as decidedly more Tahitian than European in their physical characteristics. In facial features Charles is European, Edwin is not, yet in actual shape of the head the case is reversed—Charles has the typical Tahitian head, Edwin rather the European; in texture of hair they are Tahitian rather than European. In size of brain they are typical of neither British nor Tahitian, but incline rather to the second than to the first. But there can be no question of physical degeneration; they are both splendidly developed men." They belong to the sixth generation of the descendants of the mutineers—six generations in 127 years.

THE *Museum Journal* published by the University of Pennsylvania (vol. vii., No. 4, December, 1916) contains an account of the University expedition to the Amazon in 1913, under the superintendence of Dr. F. H. Church and Mr. W. C. Farabee. An interesting account is given of the Macusi and Wapisiana tribes, representatives of the Carib and Arawak linguistic families. The Macusis practise the custom of the couvade, the father, after a child is born, taking to his bed for a month, and eating none but the most delicate foods, the mother meanwhile taking care of him and of the baby. The Wapisiana also practise the couvade, but the period of careful eating for the father extends among them to a year after he leaves his bed. Their marriage system is interesting, because they are required to marry blood relations. A man must marry his cousin from another village and take her home to his own village. He may, and often does, marry two sisters, and he can take a wife outside his family only in case there are no cousins available. They will not eat game shot by a gun or arrow, and their diet is confined to fish and fruit. The rubber traffic and the cruelty of foreigners have been fatal to the natives of this region. There are but two survivors, two sisters, of the once-important Zapara tribe. It is well that a scientific examination of them has been made before they become extinct.

Mr. H. U. Hall publishes in the *Museum Journal* of the University of Pennsylvania (vol. viii., No. 1, March, 1917) a well-illustrated paper on a collection of gods of the Yoruba tribe of the hinterland of Lagos, West Southern Nigeria. Before a burial a masked dancer wearing the shroud of the dead man dances before his relations, condoles with them, and discusses matters in which they and the dead man were interested. Offerings made to his mask are supposed to be passed on to the deceased in deathland. To prove that the dead man has gone to heaven, a person representing him is hidden in a room close by, and answers questions regarding the fate of the deceased. This person, known as Egun, seems to have been originally regarded merely as an incarnation of the dead man, but he has now developed into a kind of bogy, whose function it is to carry away persons who have become a nuisance to their neighbours—scolds, busybodies, scandalmongers. In his public character his very touch is fatal, and to threaten an Egun with personal violence, or for a woman to speak disrespectfully of him, is an offence punishable with death.

In the August number of the *Fortnightly Review* Sir Thomas Holdich discusses the suggestion of a federation of the southern Slavs into one great Jugo-Slav nationality. The federation would include Slovenes, Croats, and Serbians, and extend from the Save basin to the southern borders of Serbia, covering an area of at least 75,000 square miles, and containing a population of more than twelve millions. It would include Serbia, Bosnia and Herzegovina, Croatia, southern Styria, southern Carinthia, possibly part of Carniola, and Slavonia and Syrmia. One of the great difficulties would be the question of Dalmatia and Istria. Despite the nationality of their inhabitants, these two Adriatic lands are geographically more related to Italy than to the Balkan lands. Dalmatia is separated from Bosnia by the natural barrier of the Dinaric Alps, and would scarcely serve as the chief sea outlet for the Jugo-Slav State. That outlet, Sir Thomas Holdich thinks, should be at Salonika. It is interesting to note that the author suggests the river Drave from near its source to the Danube as part of the northern boundary, but he proposes that a new capital should be chosen for Serbia at Nish, less exposed to aggression than Belgrade.

The first part of a "Bibliography of Fishes," the work of Dr. Bashford Dean and Dr. C. R. Eastman, has just been published by the American Museum of Natural History. It consists of the first instalment (A to K) of a list of titles of papers, arranged under authors' names, and is a large octavo volume of 718 pages. When completed it will include some 40,000 titles. The authors regard the time as opportune for the preparation of a compendious list of papers dealing with fishes, since the group is fairly well known, and there is now increasing difficulty in dealing with the literature in the absence of any special bibliography. Further parts will complete the list of titles by the inclusion of anonymous publications and pre-Linnæan works. Then will follow a summary of general bibliographies in which papers dealing with fishes are listed; an account of works describing voyages and expeditions in which fishes are observed and described; and a list of periodicals relating to fish culture. A subject-index is in course of preparation, and in this part reference will be made to the index of authors' titles. These titles will not be repeated, the papers being identified by the author's name, the year of publication, and a number indicating order of publication should more than one paper have been published by the author during the same year. Fossil as well as recent forms are included. In general the bibliography deals with the morphology, development, physiology, pathology, distribution, and habits of fishes, but works on angling are not as yet considered.

The fourth part of the Annals of the Durban Museum (vol. i., pp. 291–431) is a list of the sea-fishes recorded from Natal, and is the work of Dr. J. D. F. Gilchrist and Mr. W. W. Thompson. It is purely a systematic list, containing no reference to the local occurrence, or habits, or uses of the species recorded, and its size is due to the inclusion, under each specific name, of the authors who have already described the species and of the publications in which these descriptions have appeared.

Mr. Henry J. Howard records the first-known British gathering of the Mycetozoon, *Physarum carneum* (Journ. Roy. Microscop. Soc., 1917, part iii., June, p. 265). It was first found on dead wood on Cheyenne Mountain, Colorado Springs, by Dr. Sturgis in 1908. Previous to Mr. Howard's gathering, only one other European specimen was known, from the grounds of Collegia de Campolide, Lisbon.

Mr. H. M. Steven, Carnegie research scholar in the University of Edinburgh, has published, in the Transactions of the Royal Scottish Arboricultural Society (vol. xxxi., July, 1917, pp. 131–55), an important paper on the relation of the Chermes group of insects to British forestry. These insects, which were not clearly described until recently, are remarkable for their obscure and complicated life-history. They attack conifers, and do much damage to ordinary plantations of various pines and of common larch, spruce, and silver fir. Mr. Steven gives an elaborate account, with seven figures, of the species known to exist in Britain, which are now assigned to four genera, Chermes (in a restricted sense), Cnaphalodes, Pineus, and Dreyfusia, each with two species. He admits that once a plantation is formed there is no practical method of dealing with these pests; but, as healthy, vigorous trees are scarcely attacked, much may be done in the way of prevention by choice of species clearly suitable to the conditions of the area. Certain exotic species which are at present relatively immune, may be often chosen, and amongst these are valuable trees, like Japanese larch, Sitka spruce, and Corsican pine. Steven's distinct contribution to preventive measures is based on observations that Chermes insects were often widespread in tree nurseries, and did most serious damage immediately after a plantation had been formed. Fumigation with hydrocyanic acid gas generated from potassium cyanide effectually kills insects on nursery stock, and young trees thus treated when planted out have a good chance of establishing themselves in their new environment. Subsequent infection, though possible, does little harm.

The current number of the Science Reports of the Tôhoku Imperial University (second series, Geology, vol. iv., No. 2) contains a useful contribution to our knowledge of the distribution of the genus Gigantopteris by Prof. Yabe, with descriptions of three Asiatic species by K. Koiwai. The genus Gigantopteris was founded by Schenk for some fernlike fronds from the Lui coalfield in south-central China, for which he originally proposed the name Megalopteris in ignorance of its previous use by Dawson. Dr. D. White in 1912 (Proc. U.S. Nat. Mus., vol. xl., p. 493, 1912) recorded the occurrence of a new species of Gigantopteris in Permian beds in Texas and Oklahoma, and brought forward evidence in favour of including Schenk's genus in the Pteridosperms. Prof. Yabe now records the occurrence of Gigantopteris in some new Asiatic localities, and discusses the geological and geographical range of the genus; he recognises four species, White's *G. americana* of Permian age and three from Permian and Triassic strata in Manchuria, Corea, and southern China. The chief interest of the paper lies in the additional data with regard to the distribution of Gigantopteris in space and time. Prof. Yabe also contributes a paper on "Problems concerning the Geotectonics of the Japanese Islands," with critical reviews of various opinions expressed by previous authors. The same publication includes a paper by I. Hayasaka on "A New Hydrozoan Fossil from the Torinosu Limestone (Lower Cretaceous) of Japan," for which he founds the genus Circoporella, thus directing attention to its close alliance with Circopora, a genus instituted by Waagen and Wentzel for a type from the Productus Limestone in the Salt range in India. The figures given by Hayasaka resemble sections of certain calcareous Algæ, but the resemblance may be superficial.

In the Transactions of the Geological Society of South Africa, vol. xix. (1917), p. 33, Prof. Schwarz records the discovery of diamonds in the Molteno Beds of Molteno, Cape Province, associated with other detrital minerals, such as might arise from the decay of a crystalline schist. He quotes Mr. E. J. Dunn as agreeing with him that important evidence is thus furnished that the South African diamonds are older than the igneous pipes which have brought them in many places to the surface. In the same volume (p. 54) Mr. P. A. Wagner describes from Jagersfontein nodules of ultrabasic character, peridotite and garnet-diopside-eclogite, which contain graphite, and regards them as fragments of deep-seated equivalents of the diamond-bearing kimberlite in which they occur. Mr. Wagner, in the discussion on Prof. Schwarz's paper (Proc. Geol. Soc. South Africa, 1916, p. xli), evidently recognises the divergence of view, and asks for fuller evidence that the detrital splinters are true diamonds. The much-desired section reaching down to an eclogite mass, either traversed by, or merging into, a pipe of kimberlite, is unfortunately not yet revealed in South Africa.

The cider-apple crop would appear to offer possibilities of a substantial and wholesome addition to our food supplies in these days of stringency. According to recent estimates the average English crop is not less than 200,000 to 250,000 tons, whilst that of France approaches 2½ million tons. Much of the surplus not absorbed by the cider industry has in the past been wasted owing to the difficulty of providing any satisfactory alternative outlet. In some seasons the jam manufacturer has taken considerable quantities of the sharp or acid varieties, but the sweet and bitter-sweet varieties which form the bulk of the crop have hitherto proved quite intractable, the tissues remaining tough and leathery even after prolonged boiling. This defect has been commonly ascribed to the relatively high tannin content of the cider apple, in which case it is difficult to understand the satisfactory results obtained at the jam factory with some of the sharp varieties. From experiments carried out by Prof. B. T. P. Barker at the University of Bristol Horticultural Research Station it seems more probable that the difficulty is associated with the pectins of the fruit. The Bristol experiments, of which a brief account is given in the July issue of the *Journal of the Board of Agriculture*, have shown that the yield of soluble pectins from apples is substantially increased by digestion with weak acid, and that by suitable application of this treatment, using a dilute solution of tartaric acid, the most resistant apples can be reduced to pulp and converted into a palatable jam. Citric acid serves equally well, or, if available, acid fruit or fruit juices can be used with advantage.

In the current Bulletin (vol. vii., No. 2, for June, 1917) of the Seismological Society of America, there are two studies of recent Californian earthquakes. The Tejon Pass earthquake of October 22, 1916, is described by Prof. J. C. Branner, and the Santa Barbara Channel earthquakes of April 12 and 20, 1917, by Mr. A. C. Mattei. The epicentre of the earlier and more important earthquake (of intensity 7) seems to have been near the summit of the Tejon Pass, which is about sixty miles north-west of Los Angeles; and Prof. Branner supposes that the earthquake was due to a movement along the fault which traverses the pass in the E.S.E. direction. It has been suggested, though on insufficient evidence, that this fault is a continuation of the San Andreas fault along which the San Francisco earthquake of 1906 originated. All three earthquakes here described visited thinly populated districts, and the maps of isoseismal lines which accompany the papers can only be regarded as approximate. In the same number Mr. Otto Klotz gives a brief notice of the late Prince Galitzin, and also a revised determination of the velocity of the L or surface waves. In adopting the value of 230 km. per minute, he considers that more extended data will confine any amendment of this value within one per cent.

The report on the work of the Imperial Institute just presented to the Executive Council states that, apart from confidential reports to the Admiralty, the Ministry of Munitions, the War Trade Department, and other Government departments, reports were completed on the composition, value, and commercial prospects of raw materials from eighteen countries in the Empire overseas, while the inquiries received and answered related to as many as thirty British countries. A possible new raw material for paper manufacture is indicated by the increasing use of wattle bark by British tanners. Large quantities of the spent bark are likely to be available in the United Kingdom, and investigations conducted at the Imperial Institute show that, though the yield of pulp from the bark is somewhat low, the material is promising for the production of brown paper and the cheaper grades of white or cream papers, such as newspapers. Arrangements are being made at a British paper mill for a large-scale trial of the spent bark. A special monograph dealing with the occurrence and utilisation of zinc ores through the world, with special reference to the British Empire, is in preparation. An inquiry has been received from Zanzibar regarding the disposal of clove stems, which before the war were shipped principally to Germany.

The possibility of distilling oil from them has been discussed with a number of essential oil distillers, and as a result it appears probable that a market may be found for the stems for that purpose.

DR. P. P. PODJAPOLSKY has for some years been investigating the occurrence of chlorophyll in various animals ("On Chlorophyll in Animals and on the Fate of Chlorophyll in the Animal Organism," Moscow, 1916). He finds that a green pigment, giving an absorption band between the lines B and C of the spectrum, can be extracted from the wings and elytra of a number of Orthoptera, and from the skin of some frogs (*Rana esculenta, Hyla arborea*). As the band described coincides exactly with that shown by an extract of a green leaf, such as that of Robinia, he concludes that chlorophyll itself is present in these animals. He suggests that chlorophyll in animals may be produced *de novo* by the animal, or it may be derived from ingested plant material escaping digestion wholly or in part, or it may be the result of symbiosis. He states also that the chlorophyll band between B and C may be observed in spring in the bile of grass-fed herbivorous animals, such as cows and sheep. Dr. Podjapolsky has been able to recognise not only chlorophyll but also bile pigment in a pyridine extract of the contents of the stomach of the mammoth discovered in a glacier at Beriosov, and now preserved at Petrograd. From the position of the animal it would seem to have slipped backwards on the ice, and its violent efforts to recover itself probably caused a regurgitation of bile into the stomach. It is surprising that the author makes no attempt to explain his use of the term chlorophyll, and gives no reference to the work of Willstätter, who has, of course, clearly shown that crude chlorophyll contains four distinct pigments, two green and two yellow.

THE well-known "Index of Spectra" compiled by Dr. Marshall Watts (London: W. Wesley and Son) has been further extended by the recent publication of Appendix X. The principal tables refer to the arc and spark spectra of gadolinium, gallium, germanium, gold, holmium, indium, and copper, and to the spectra of hydrogen and helium. Most of these have been brought well up to date, but the extension of the band spectrum of helium by Fowler, and the important observations of the "proto-helium" lines by Paschen, appear to have been overlooked. In the case of elements having very complex spectra, the tables have been shortened by the exclusion of the fainter lines, and it will still be necessary to refer to original sources when full information is required. Formulæ are given for certain spectral series, and in this connection it may be noted that Dr. Watts continues to use the term "oscillation-frequency" when "wave-number" is meant. References to recent literature are very numerous, and the new appendix will be a valuable aid to those who are engaged in spectroscopic investigations.

MESSRS. MASSON ET CIE (Paris) have in preparation for appearance in their series "Collection Horizon, Précis de Médecine et de Chirurgie de Guerre":—"Plaies de la Plèvre et du Poumon," Prof. R. Grégoire; "Troubles mentaux de guerre," Prof. J. Lépine; "Blessures de la Moelle et de la Queue de cheval," Drs. G. Roussy and J. Lhermitte; "Electro-diagnostic de guerre: Clinique. Conseil de réforme. Technique et interprétation,' Prof. A. Zimmern; and new editions of "Hystérie-Pithiatisme et Troubles nerveux d'ordre réflexe en Neurologie de guerre," J. Babinski and J. Froment; "Formes cliniques des Lésions des Nerfs," Mme. Athanassio-Benisty; "Les Blessures de l'abdomen," J. Abadie.

OUR ASTRONOMICAL COLUMN.

THE AUGUST METEORS OF 1917.—Mr. W. F. Denning writes that at Bristol the weather conditions were very favourable for observation on Saturday, August 11. The number of meteors visible to one observer in 4h. 40m. watching, 9h. 10m. and 14h. 10m. Greenwich Mean Time, was 219, of which 195 were Perseids. Mr. Denning was assisted in recording the shower by a friend, Mr. P. O. Wright, who, alternately with the former, counted the meteors as they appeared. A few rather brilliant objects were seen, four being estimated to equal Venus and nine to equal Jupiter, while there were many first magnitudes. The radiant was situated in the usual position at 45° + 58°, and the point was well defined. The maximum of the shower occurred between 13h. and 14h. G.M.T., when more than one meteor per minute appeared, though the moon, a little past the last quarter, was shining in the heavens. On the whole the shower was decidedly brighter than the average, both in point of numbers and in the brilliancy of the meteors. It was probably the best Perseid display witnessed at Bristol since 1898. Of the minor showers of the epoch there was comparatively little evidence, but there was a prominent shower of Cygnids from about 292° + 50°. The meteors were bright, and at the ends of their flights burst with flashes of bluish-white light. This shower was also well observed contemporary with the Perseids in August, 1893.

NEW ELEMENTS OF MARS.—An investigation of the discordance between the positions of Mars deduced from observations and those computed from Newcomb's tables has been made by Dr. F. E. Ross, and published by the Nautical Almanac Office, U.S. Naval Observatory (Astron. Papers, vol. ix., part ii.). The following new elements of the orbit of the planet are given:—

Fundamental epoch, 1900 Jan. 0, Greenwich Mean Noon. T, time from this epoch in Julian centuries.

Mean Longitude:—

$$l = 293^\circ\ 44'\ 51{\cdot}46'' + (53 \text{ rev.} + 222117{\cdot}33'')T + 1{\cdot}1184''T^2.$$

Longitude of Perihelion:—

$$\pi = 334^\circ\ 13'\ 5{\cdot}53'' + 6626{\cdot}73''T + 0{\cdot}4675''T^2 - 0{\cdot}0043''T^3.$$

Eccentricity:—

$$e = 19247{\cdot}168'' + 18{\cdot}9895''T - 0{\cdot}0158''T^2.$$
$$= 0{\cdot}09331290 + 0{\cdot}000092064T - 0{\cdot}000000077T^2.$$

Longitude of Node:—

$$\theta = 48^\circ\ 47'\ 11{\cdot}19'' + 2775{\cdot}57''T - 0{\cdot}005''T^2 - 0{\cdot}0192''T^3.$$

Inclination to Ecliptic:—

$$i = 1^\circ\ 51'\ 1{\cdot}20'' - 2{\cdot}430''T + 0{\cdot}0454''T^2.$$

Logarithm of Mean Distance:—

$$\log a = 0{\cdot}182897034.$$

Theory and observation, which were discordant to the amount of six seconds of arc in R.A. in 1905 and 1907, are brought into more satisfactory agreement by these elements. Tables for correcting the heliocentric positions are given.

ELEMENTS OF SUN'S ROTATION.—A new determination of the direction of the sun's axis has been made by Th. Epstein (*Astronomische Nachrichten*, 4892). It is based upon observations of fifty-eight spots in various latitudes, made in the years 1903 to 1910. The value obtained for the longitude of the ascending node of the equator is 73° 59·2′, and for the inclination of the axis to the ecliptic 82° 43·7′. These are in very close agreement with Carrington's values, and there is evidently no sufficient reason to modify the existing tables for physical observations of the sun.